

REMARKS

Claims 11- 18 are pending and stand rejected.

Claims 11 and 17 have been amended to state that polyamide/polyolefin layer is the primary barrier layer. This amendment is supported by the examples in which the polyamide/olefin layer is the only barrier layer, original disclosure on page 3, lines 6 – 10 stating the greater barrier properties of the PA/PO nanotube blend, and the fact that other layers sometimes used as barrier layers are only optional, and not required in the construction.

Response to the Examiner's Comments on Applicant's previous Arguments:

The Examiner contends that Applicant's claim limitation that the polyamide/polyolefin with carbon nanotubes acts as a "barrier layer" to alcohol fuels does not lend patentable distinction over the Jadamus reference.

Applicants claims have been amended to point even more strongly to Applicant's invention of using the polyamide/polyolefin/carbon nanotube layer as the primary barrier layer. The Jadamus reference used carbon nanotubes to replace carbon black for anti-static purposes. The Jadamus Examples all include a barrier layer – which is not surprising as Jadamus teaches the importance of a separate barrier layer (col. 2, lines 13-17) as an intermediate layer, and describes useful barrier layers (Col. 5, lines 1-8). In all but one of the Jadamus examples, barrier layers are a part of the construction – and in Example 5 (no barrier layer) the fuel leakage was not measured – only the impact resistance and the surface electrical resistance – which is the reason for the carbon fibers. There is no teaching or suggestion in the Jadamus reference to use a combination of a blend having a polyamide matrix and a polyolefin with carbon nanotubes to act as a barrier layer for an alcohol-containing fuel.

Applicants have found that the proper blend of polyamide, polyolefin and carbon nanotubes can be used as the barrier layer of a multi-layer tube to impart barrier properties to alcohol-containing fuels. This use of the polyamide/polyolefin with carbon nanotubes as the barrier layer (and not just as an antistatic layer in combination with

other barrier layers) distinguishes Applicant's invention from the Jadamus reference. While the Jadamus reference teaches the extra barrier layer – which adds cost and expense, Applicant's have found that a multi-layer hose can use the polyamide/polyolefin with carbon nanotubes as the main barrier layer, saving the expense of addition barrier layers.

In the Advisory Action, the Examiner contends that “the Vestamide-graphite inner layer would function as the primary barrier layer given its close proximity to the fuel. Applicant notes that the proximity to a fuel does not signify that an inner layer constitutes a barrier layer. The inner layer may be chemically designed for other purposes, and the barrier layer is more often a middle layer. Every single layer of a fuel hose offers some degree of resistance to a fuel, or a component of the fuel. That does not make every layer a primary barrier layer. Even in the Jadamus '459 patent, a middle barrier layer of PES or PVDF is needed in the examples. This barrier layer is not the inner layer in contact with the fuel.

35 U.S.C. §103(a)

Jadamus in view of Nakajima and Chacko

Claims 11-18 stand rejected under 35 U.S.C. 103(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Jadamus et al et al, US 6,090,459, in view of Nakajima (US 5,376,712) and further in view of Chacko (US 6,617,377).

The '459 reference fails to teach all of Applicant's claim limitations, as amended, and therefore fails to present a *prima facie* of obviousness. Specifically, the '459 reference fails to teach the use of a polyamide/polyolefin blend having carbon nanotubes for use as the primary barrier layer for alcohol-containing fuels.

The '459 reference discloses the use of carbon nanotubes in an electrically conductive inner polyamide layer of a multi-layer plastic pipe. There is no disclosure in the '459 reference that would teach or suggest a method for improving barrier properties to alcohol-containing fuels, as invented by Applicant.

The '459 reference teaches away from the use of a polyamide/polyolefin/carbon nanotube layer as an alcohol-fuel barrier layer, by teaching the use of an additional barrier layer (Col. 2, line 14-18) to serve as a fuel component barrier layer. Since the use

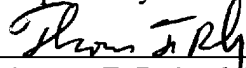
of a polyamide/polyolefin/carbon nanotube layer was not recognized as a result-effective variable as a barrier layer, it cannot be optimized by routine experimentation (MPEP 2144.05).

Further, impact modification is optional in the '459 patent (Col. 3, line 9) and if used could be of a large wash list of materials covering the known impact modifiers for thermoplastics, including copolymers and core-shell polymers. The proportions for use of the impact modifier are not even taught by the '459 reference. The '459 reference teaches a method for providing electrical conductivity to a plastic pipe. There is no teaching or suggestion of choosing a specific set of compositions in order to provide the alcohol-fuel barrier property improvement claimed by Applicant.

Neither the Nakajima or Chacko references describe any barrier layer properties of carbon-nanotube containing plastics, and therefore fail to heal the defects in the '459 reference to teach or disclose all of Applicant's claim limitations

Since the cited references fail to present a *prima facie* case of anticipation or obviousness over the claims as amended, Applicant believes that the reasons for rejection have been overcome, and the claims herein should be allowable to the Applicant. Accordingly, reconsideration and allowance are requested.

Respectfully submitted,



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Date: March 31, 2008

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